Third Five-Year Review Report
for
Ormet Corp. Superfund Site
Monroe County, Ohio

Prepared by:
United States Environmental Protection Agency
Region 5
Chicago, Illinois

May 2012

Approved by:

for Richard C. Karl, Director
Superfund Division
U. S. EPA, Region 5

Date:

5/4/2012

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List of Acronyms

ARARs	applicable or relevant and appropriate requirements
CFR	Code of Federal Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMSD	construction materials scrap dump
CRDA	carbon runoff and deposition area
ESD	Explanation of Significant Difference
FDP	former disposal pond
FS	feasibility study
FSPSA	former spent potliner storage area
HRL	health risk limit
IC	institutional control
MCL	maximum contaminant level
msl	mean sea level
NCP	National Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and maintenance
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene (perchloroethylene)
PRP	potentially responsible party
RA	remedial action
RCRA	Resource Conservation Recovery Act
RD	remedial design
RI	remedial investigation
ROD	Record of Decision
SDWA	Safe Drinking Water Act
SMCL	secondary maximum contaminant level
SVOC	semi-volatile organic compound
TCE	trichloroethene
TSCA	Toxic Substances Control Act
UECA	Uniform Environmental Covenants Act
U. S. EPA	United States Environmental Protection Agency
UU/UE	unlimited use or unrestricted exposure
VOC	volatile organic compound
WAD cyanide	weak-acid dissociable cyanide

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Executive Summary

The Ormet Corp. Superfund Site (Site) comprises the eastern portion of the Ormet reduction plant property located outside Hannibal, Monroe County, Ohio. Plant wastes were historically disposed of on the ground or in unlined lagoons in this area. The remedy for the Site included the continued pumping of the Ranney well in conjunction with pumping of the interceptor wells for plume containment and removal of contaminants to reach cleanup standards; construction and operation of a soil flushing system in the former spent potliner storage area (FSPSA) to remove contaminants from the soil contributing to the groundwater contamination; construction of a landfill and a Toxic Substances Control Act (TSCA) cell at the construction materials scrap dump (CMSD); construction of a means for collecting the leachate at the CMSD landfill and a pre-treatment system for its treatment and subsequent operation of the system; removal of contaminated soils and sediments from the carbon runoff and deposition area (CRDA) and the outfall 4 stream backwater area and placement of the removed materials in the CMSD landfill or the TSCA cell within it; fencing; maintenance of the remedial components; and deed restrictions prohibiting potable use of groundwater and residential use of the Site. The Site achieved construction completion with the signing of the Preliminary Close Out Report on August 4, 1998. The trigger for this review was the signing of the Second Five-Year Review Report on May 4, 2007.

The Ranney well and the interceptor wells began operation many years before construction of the remedy. These wells have continued to contain the plume and remove contaminated water from the aquifer after construction of the remedy was completed. The flushing system was operated on a trial basis in 1998 and since 1999 it has been operated each year except during the colder months. Since the last five-year review was issued, an Environmental Covenant has been recorded with the county to provide for improved institutional controls, and a second Explanation of Significant Differences was issued in March 2012 to allow the discontinuation of the operation of the interceptor wells and their associated treatment system.

The assessment of this five-year review is that the remedy was constructed in accordance with the Record of Decision (ROD) and the first Explanation of Significant Differences. The remedy is functioning as anticipated. The remedy at the Ormet Corp. Superfund Site is protective of human health and the environment in both the short- and long-term. Exposure pathways that could result in unacceptable risks are being controlled and an Environmental Covenant is preventing exposure to contaminated groundwater and land. Threats at the Site have been addressed through capping, excavation, soil flushing, plume containment, installation of fencing, and implementation of institutional controls.

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Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Ormet Corp.		
EPA ID: OHD004379970		
Region: 5	**State:** OH	**City/County** Near Hannibal/Monroe County
SITE STATUS		
NPL Status: Final.		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: U. S. EPA		
Author name (Federal or State Project Manager): Bernard J. Schorle		
Author affiliation: U. S. EPA		
Review period: 5/07 to 5/12		
Date of site inspection: April, 12, 2012		
Type of review: Statutory		
Review number: Third		
Triggering action date: 5/04/07		
Due date ***(five years after triggering action date)*****:** 5/04/12		

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 1	**Issue Category:** Institutional controls			
	Issue: No issues were identified during the five-year review that affect the protectiveness of the remedy.			
	Recommendation: No recommendations or follow-up actions were identified during the five-year review, other than to verify the institutional controls as discussed in Section IV before the next five year review.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes.	PRP	U. S. EPA	May 2013

Sitewide Protectiveness Statement (if applicable)

Protectiveness Determination:
Protective.

Protectiveness Statement:
The remedy at the Ormet Corp. Superfund Site is protective of human health and the environment in both the short- and long-term. Exposure pathways that could result in unacceptable risks are being controlled and an Environmental Covenant is preventing exposure to contaminated groundwater and land. Threats at the Site have been addressed through capping, excavation, soil flushing, plume containment, installation of fencing, and implementation of institutional controls.

Ormet Corp. Superfund Site
Monroe County, Ohio
Third Five-Year Review Report

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in a five-year review report. In addition, the five-year review report identifies issues found during the review, if any, and identifies recommendations to address them.

The Agency is preparing this five-year review report pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Part 300). CERCLA §121 states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The United States Environmental Protection Agency (U. S. EPA), Region 5, which is the lead agency for the Site, has conducted the five-year review of the remedy implemented at the Ormet Corp. Superfund Site in Monroe County near Hannibal, Ohio. This review was conducted for the entire Site by the remedial project manager (RPM) for the period from May 2007 through April 2012. This report documents the results of the review.

This is the third five-year review for the Ormet Site. The triggering action for this statutory review is the signature date of the second Five-Year Review Report on May 4, 2007. The five-year review is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

The following table (Table 1) presents a chronology of events at the Ormet Corp. site.

Table 1. Site Chronology

Event	Date
Plant started operations	1958
Placement of spent potliner in former spent potliner storage area (FSPSA)	1958 to 1968
Use of retention disposal ponds (former disposal ponds--FDPs)	1958 to 1981
Wastes to construction materials scrap dump (CMSD)	1966 to mid 1979
Removal of much of the spent potliner	1968 to 1981
Verification of groundwater contamination in the Ranney well at the reduction plant and subsequent installation of interceptor wells	about 1972
Proposed to National Priorities List (NPL)	9/18/85
Administrative Order by Consent between Ormet Corporation, Ohio Environmental Protection Agency (Ohio EPA), and U. S. Environmental Protection Agency (U. S. EPA) for Ormet to perform the remedial investigation (RI) and feasibility study (FS), reported effective date	5/19/87
Finalize on NPL	7/21/87
Remedial Investigation Report	12/29/92
Feasibility Study Report including Addendum required by U. S. EPA	December 1993
Proposed Plan	Undated, reportedly released 4/11/94
Public meeting for the Proposed Plan, FS Report, RI Report, and other documents	4/20/94
End of comment period for the Proposed Plan	6/10/94
Record of Decision (ROD)	9/12/94
Consent Decree for remedial design and remedial action between Ormet Primary Aluminum Corporation and U. S. EPA	Lodged 9/28/95 Entered 12/18/95
First Explanation of Significant Differences (ESD)	4/1/97
Approval of design	4/15/97
Preliminary Close Out Report signifying construction completion	8/4/98
First Five-Year Review Report	5/6/02
Discovered part of CMSD landfill cover had failed and slid down the side	6/13/06
Second Five-Year Review Report	5/4/07
Amendment to the Consent Decree	Entered 3/11/2009
Environmental Covenant recorded	4/16/10
Second Explanation of Significant Differences	3/26/12

III. Background

Physical Characteristics

The Ormet Corp. Superfund Site (Site) comprises part of the northeast portion of the Ormet Primary Aluminum Corporation reduction plant property located in Monroe County, Ohio, approximately 3 miles north of the city of Hannibal in the southeastern part of the state. The Ormet reduction plant produces aluminum. Plant wastes were historically disposed of on the ground or in unlined lagoons in this area (see more detailed description of the Site below). The reduction plant is located along the Ohio River at approximately river mile 123, about 35 miles south of Wheeling, West Virginia. The property is bounded on the northwest by Ohio State route 7 and on the east and southeast by the Ohio River. Located immediately to the west of the

reduction plant facility is other industrial property. This property was the location of the former Consolidated Aluminum Corporation (CAC) rolling mill, which was later owned and operated by the Ormet Aluminum Mill Products Corp. The rolling mill shut down in 2005 and the property was sold in 2007. Mixed-use commercial and industrial facilities, including a steel fabrication facility, currently operate on the former rolling mill property.

Land and Resource Use

Since the reduction plant started operations in 1958, the main process has been the reduction of alumina to produce aluminum metal, and the plant is producing aluminum from alumina at the present time.

The alluvial aquifer beneath the surface of the reduction plant was a source of both process and drinking water for the reduction plant and the rolling mill until the rolling mill was shut down in 2005. Prior to 2005, two high capacity Ranney wells, one on the reduction plant's property and the other on the rolling mill's property pumped close to four million gallons per day. Water from the rolling mill's Ranney well was used for drinking water by both plants. The reduction plant's Ranney well was, and continues to be, used to provide non-contact cooling water, presently producing about 1.0 million gallons per day. Since the shutdown of the rolling mill, its Ranney well has not been pumped and it has now been abandoned. The reduction plant now obtains its drinking water from a public water supply. Ormet has stated its intention is to implement deed restrictions on the rolling mill property which will absolutely prohibit all use of groundwater beneath the rolling mill property.

History of Contamination

From 1958 to 1968, spent potliner, a hazardous by-product of the aluminum production, was placed in an unlined open area in the northeast area of the Site, which is referred to as the former spent potliner storage area (FSPSA). (Many of these areas are shown in Figure 1, which also shows the monitoring wells.) From 1968 to 1981, much of the potliner waste was removed and transported to an on-site recovery plant that recovered a useable material called cryolite from the potliner. A waste slurry from the cryolite recovery plant was routed to former disposal pond (FDP) No. 5; FDPs No. 1 through No. 4 may have received minor amounts of cryolite plant waste. These tailings were alkaline and consisted primarily of carbonaceous material from the potliner along with sodium and calcium-based salts. Since 1980, the remaining potliner material has been transported off-site for disposal.

At various times from 1958 to 1981, one or more retention disposal ponds were used. These are the five former disposal ponds mentioned above, which are unlined and constructed of natural materials. Primarily, ponds 1 through 4 were used for the disposal of process wastes from the air emissions wet scrubbing system in the form of a sludge, the primary constituents of which were alumina, particle carbon, and calcium-based salts.

From about 1966 until mid 1979, Ormet deposited waste construction materials and other miscellaneous plant debris in the southeastern corner of the Ormet property, adjacent to pond 5. This four to five acre area is designated the construction materials scrap dump (CMSD). An area referred to as the carbon runoff and deposition area (CRDA) contained carbon deposits, probably

carried there by storm water runoff from the Ormet plant area. Some of the carbon runoff may also have entered the 004 outfall stream and backwater area.

Initial Responses

In 1972, a hydrogeologic study verified the presence of groundwater contamination in the Ranney well pumping center at the reduction plant. As a result of this study, two interceptor wells (#1 and #2) were installed north of this Ranney well to intercept the plume before it reached the pumping center in an effort to prevent fouling of the cooling water system used in the plant. The waste disposal areas on the reduction plant were the sources of the groundwater plume, which extended about 3,000 feet southwest from these sources until it reached the interceptor wells. Although the groundwater underneath the reduction plant was not used for drinking water, drinking water was being obtained from this aquifer at the rolling mill. The rolling mill Ranney well was located about 2,000 feet to the west of the reduction plant's Ranney well and provided drinking water to about 3,200 employees of both plants. The contamination at the reduction plant source areas, combined with its potential impact on downgradient drinking water supplies, prompted U. S. EPA to propose that the Site be placed on the National Priorities List (NPL) in September 1985. In May 1987, the U. S. EPA, Ohio Environmental Protection Agency (Ohio EPA), and Ormet Corporation entered into an Administrative Order by Consent (Consent Order) providing for Ormet to conduct a remedial investigation (RI) and feasibility study (FS) under the oversight of U. S. EPA and Ohio EPA. The remedial investigation report was completed in December 1992 and the feasibility study report was completed in December 1993. In addition to defining the contamination found in the disposal areas described above, during the remedial investigation seeps were discovered near the plant recreational area ball fields and along the western edge of the CMSD. The seeps contained cyanide in concentrations up to 950 ppb.

The Superfund Site is to the east of the reduction plant manufacturing facilities, called the Ormet plant proper on Figure 1. On this figure there is a line (fence) that runs near well MW-3 near the south end and well MW-28 near the north end. This fence line and the outlines of FDP-1 and FDP-2 form the western boundary of the Superfund site. FSPSA, FDP-3, FDP-4, FDP-5, CMSD, and CRDA are also indicated on the map and are included in the Site. The Superfund site is also shown on Figure 2.

The discussion in the rest of this section covers what was found during the remedial investigation. Cyanide, fluoride, chromium, arsenic, and polynuclear aromatic hydrocarbons (PAHs) were found in solids from the FDPs. The contaminants did not appear to be migrating to any significant degree, either to groundwater or air, except that fluoride was present in groundwater downgradient of FDP-5 at levels that exceeded the maximum contaminant level (MCL). A comparison with sample results from 1972 showed that fluoride concentrations down-gradient of FDP-5 had decreased by one to three orders of magnitude at a given sampling location. Pond solids were found to be characteristically alkaline in nature and no evidence was found of surface runoff from the ponds.

At the FSPSA, relatively high concentrations of PAHs were detected in soils in the 2 to 4 foot horizon. Because PAHs are relatively immobile, they were not expected to contribute signifi-cantly to releases to groundwater from the FSPSA. Moderate levels of cyanide and arsenic, both

mobile in groundwater, were identified in the FSPSA. The FSPSA was found to be the primary contributor to cyanide and fluoride contamination in groundwater, and may also be a factor in the arsenic showing up in downgradient wells. In contrast to the situation at FDP-5, fluoride levels in and downgradient of the FSPSA were found to have shown an increasing trend since 1972.

The CRDA is underlain by moderate to low-permeability soils. A single composite sample from the CRDA showed polychlorinated biphenyls (PCBs) at 56 mg/kg. The CRDA was thought to be a probable source of PCBs and PAHs to the backwater and river bank areas, transported by storm water runoff. Arsenic was also detected as high as 83 mg/kg in soils at the CRDA.

The CMSD was found to be a significant source of cyanide and PCBs in the seeps, backwater sediments, and river water. The principal transport mechanism appeared to be the discharge of seep water to the 004 outfall stream. A low-permeability clay/silt layer was found underneath the CMSD which appeared to provide a natural barrier to contaminants leaching to groundwater, and the reduction plant's Ranney well creates a hydraulic gradient away from the river, so groundwater discharge to surface water is not considered a reasonable migration pathway. PAHs were found at levels that contributed to an increased ecological risk but were not believed to be migrating out of the source area.

Groundwater at the Site was found to be contaminated in excess of MCLs for a number of contaminants, including tetrachloroethene (PCE), cyanide, fluoride, arsenic, antimony, and beryllium. The primary source of the plume appeared to be infiltration of precipitation through the FSPSA. The plume extended about 3,000 feet from the FSPSA before it reached the interceptor wells. It was characterized by a basic pH near the FSPSA, which became progressively more neutral with distance from the source. Sodium was also typically elevated in the plume. Table 1, taken from the 1994 Record of Decision, shows the ranges of concentrations as well as the clean-up standards specified for chemicals of concern in groundwater at the Site.

Table 2. Clean-up Standards for Chemicals of Concern in Groundwater

Chemicals of Concern for Groundwater	Concentration Range (µg/l)	Clean-up Standard (µg/l)
tetrachloroethene	5.0--40	5[a]
arsenic	1.8--394	10[b]
beryllium	0.25--35	4[a]
cyanide	11.0--18,600	200[a]
manganese[e]	ND--15,400	230[c,d]
vanadium	2.6--369	260[a]
fluoride	100--710,000	4000[a]

a. maximum contaminant level (MCL) or proposed MCL; for cyanide, the value is the concentration of cyanide amenable to chlorination, not total cyanide
b. analytical quantitation limit (greater than background); background, however, has not been firmly established
c. risk based
d. background
e. This is an interim standard for manganese, based on background determined during the risk assessment; further analysis is to be performed to determine what background should be.

A small backwater area at the mouth of the 004 outfall stream created a sink for contamination. PCBs at nearly 100 ppm and total PAHs at over 1100 ppm were identified in the sediments.

Although industrial activity upstream from the Site contributed a certain level of contamination to the Ohio River water and sediments as they reached the Site, effects from the Site were found in both media. The effects were mainly in the form of elevated (basic) pH and concentrations of PAHs, PCBs, and cyanide. Because the two Ranney wells make the river a losing stream in this stretch, storm water runoff and seep discharge were found to be the most likely transport mechanisms to the river.

The risk characterization for the baseline risk assessment for human health that was performed during the remedial investigation indicated that estimated risks were greatest under a future residential land use scenario that included direct contact with and ingestion of contaminated soils and sediments, inhalation of particulate matter, ingestion of contaminated groundwater, and ingestion of fish contaminated with polychlorinated biphenyls (PCBs) from the Site. A significant area of controversy concerning the Site at the time the remedy was selected was the question of whether future residential development of the Site was a likely use, and therefore whether residential use was a reasonable scenario on which to base the selection of the remedy.

The Site was part of an active manufacturing facility in a rural area next to another manufacturing facility. There were no residences in the immediate area, and Monroe County census figures indicated a 10% decrease in population in the previous eight years. As a result, U. S. EPA believed it was reasonable to assume that the current land use would continue for the foreseeable future and that residential development of the Site would be highly unlikely. Therefore, the selected remedy was based on cleaning up to standards based on future commercial or industrial use of the property. However, U. S. EPA also believed it was reasonable to assume that at some time in the future the Ranney well at the reduction plant might no longer be used, in which case containment of the plume would be lost and contamination might reach the Ranney well at the rolling mill which, at the time, supplied drinking water. Therefore, the remedy selected included the restoration of the groundwater to drinking water quality.

The environmental evaluation performed for the Site for the remedial investigation concluded that the contaminants of concern (many more substances than the seven listed in the table above) from an ecological standpoint were known to produce sublethal and other toxic effects in the types of organisms found on the Site. Sediments from the southwestern CMSD seeps and the backwater area produced high mortality among bioassay organisms. Surface water in the backwater area and immediately downstream exceeded the four-day average ambient water quality criteria (AWQC) for antimony, lead, cyanide, and PCBs. Cyanide at two locations exceeded the one-hour average criterion. This demonstrated that the Site's contaminants in river water could potentially cause lethal and sublethal effects in aquatic organisms. In addition, concentrations of contaminants in river sediments were compared to reference sites (relatively clean) and sites with a high occurrence of tumors in fish. Sediments on-Site and downstream of the Site exceeded the lowest concentrations for PCBs and PAHs observed at the fish tumor sites. Backwater area PAH concentrations exceeded the highest levels reported from the fish tumor sites, indicating the backwater area was likely to pose severe carcinogenic risk to fish entering from the Ohio River due to exposure to PCBs and PAHs in sediments. The CMSD and the

CRDA were considered the likely sources for PCBs and PAHs in the backwater area sediments and the river.

Basis for Taking Action

The backwater area sediments posed a current threat to human health and the environment and were to be addressed by the remedy specified in the ROD. The CRDA and CMSD, while not posing unacceptable risks themselves, were sources of contamination for the sediments and were to be addressed by the remedy. The FSPSA and groundwater contamination were to be addressed because the aquifer was, at the time, a source of drinking water, and under a future scenario where the reduction plant's Ranney well would cease pumping, the drinking water well at the rolling mill could become contaminated.

The former disposal ponds were carried through the feasibility study because under the future residential use risk assessment they presented an unacceptable risk. It was later decided that future residential use of this area was an unlikely scenario. Under none of the current use scenarios did these ponds contribute any significant risk. Estimated risk under future industrial use fell within the acceptable risk range. While FDP-5 appeared to be a source of elevated fluoride in the groundwater, data from the previous 20 years indicated a steady decrease in fluoride levels downgradient of FDP-5 due to the pumping of the interceptor wells and the Ranney well at the reduction plant. It was thought to be reasonable that this trend would continue and that Site-wide groundwater monitoring during remedial action would provide a basis for determining whether the downward trend was continuing. Therefore, the ROD stated, ". . .these areas will not require active remedial action, and will not be considered further in this decision document." Although the ROD later says that the no action alternative was being selected for the FDPs, in actuality limited action was selected for the FDPs. The FDPs were to be enclosed within the fence that was to surround the areas being addressed and, although not clearly stated, were to be subject to the property restrictions that were to be imposed. Also, the area to be monitored for groundwater compliance was to include locations downgradient of FDP-5. See the Site-wide part of the Remedy Selection section below for further information on these restrictions.

IV. Remedial Action

Remedy Selection

The components of the remedy resulting from the 1994 Record of Decision and the 1997 Explanation of Significant Differences (ESD) are:

- Groundwater. Pumping of the reduction plant's Ranney well and the existing interceptor wells would continue in order to maintain a capture zone for the contaminated groundwater to prevent contaminants from migrating to the Ohio River or to the rolling mill property. Interceptor well water would be treated by ferrous salt precipitation and clarification or other means necessary to achieve standards set by the Ohio EPA National Pollutant Discharge Elimination System (NPDES) program before discharge to the Ohio River. The remedial goal for groundwater was restoration to drinking water quality, based on the fact that the aquifer was being used as a drinking water source. Therefore, groundwater cleanup standards were established that, when attained, would allow for

potable uses of the groundwater; compliance with these cleanup standards must be attained throughout the plume. Groundwater would continue to be extracted and partially treated until the ground water cleanup standards are attained.

- Leachate. Trench drains would be installed to intercept and extract all leachate seeping from the CMSD to prevent seep water from contaminating stream backwater sediments and river water. The leachate would be treated to meet NPDES discharge limits.

- CMSD. The CMSD would be recontoured and covered with a dual-barrier cap that would meet the requirements of Subtitle C of the Resource Conservation Recovery Act (RCRA). A Toxic Substance Control Act (TSCA) cell would be constructed within the CMSD.

- Soils. Residual soil contamination in the FSPSA would be treated by in situ soil flushing. Contaminants would be flushed to the groundwater for ultimate capture and treatment by spraying the area with water that would dissolve the contaminants contained in the soil. The FSPSA was determined to be the primary contributor of fluoride and cyanide contamination to the underlying groundwater. The goal of the in situ soil flushing is to remove sufficient contaminants from the soils such that the soils no longer cause or contribute to exceedances of the groundwater cleanup standards in the underlying and downgradient groundwater. The ROD provided that during the design phase of the remedy a soil model acceptable to U. S. EPA would be used to develop Site-specific soil cleanup standards for the groundwater contaminants of concern for which groundwater cleanup standards had been established. These soil cleanup standards have not been developed as yet. Treatment of the FSPSA soils by soil flushing would continue until the soil cleanup standards are achieved and when all compliance points for groundwater in and downgradient of the FSPSA achieve the groundwater cleanup standards. Contaminated soils from the CRDA would be excavated and consolidated under the cover at the CMSD. Soils to be excavated from the trench drains would also be consolidated under the CMSD cap. Soils with PCB levels at or above 50 ppm would be placed in the TSCA cell.

- Sediments. PCB- and PAH-contaminated sediments would be removed by dredging in the outfall 004 stream backwater area. Sediments with PCB concentrations lower than 50 ppm would be stabilized and consolidated under the CMSD cap in the original decision and sediments with PCB concentration higher than 50 ppm were to be disposed of off-site. In the ESD it was decided to build a TSCA cell as part of the CMSD landfill and place all of the PCB-contaminated sediments in the cell.

- Site-wide. Restrictions on Access and Use of the Site. Access to the Site would be physically restricted by installation and maintenance of a 6-foot high chain link fence topped with three strands of barbed wire. Deed restrictions were to be established to prohibit use of groundwater for drinking water until cleanup standards are achieved and use of the Site for residential purposes.

Regarding Ohio EPA's opinion of the remedy selected in the ROD, the ROD said, "The State of Ohio did not concur with the proposed plan because it felt the plan was not stringent enough. Given the revised risk management scenario and associated no-action component at the former

disposal ponds, the State does not concur with the selected remedy either."

The selected remedy is based on a clean-up of the soils to standards based on future commercial or industrial use of the property. The remediation goal for the groundwater is restoration to drinking water quality.

The 1997 ESD made two changes to the remedy. The TSCA protocols at the time allowed residuals up to 10 ppm PCBs if the soil was covered with a 10-inch layer of soil, and this was permitted for the remedy here; the ROD had specified excavation to 1 ppm PCBs. The other change allowed the construction of a TSCA compliant cell on the Site, as mentioned above. With this change, it was not necessary to haul soils with greater than 50 ppm PCBs to an off-site TSCA landfill; those soils with less than 50 ppm PCBs were also placed in the cell. The reason for the change was that it was found during the design that there were more soils with greater than 50 ppm PCBs than had been thought.

A second ESD was issued on March 26, 2012. This ESD is discussed in Section V, "Progress Since the Last Five-Year Review".

Remedy Implementation

A Consent Decree for remedial design and remedial action between Ormet Primary Aluminum Corporation and U. S. EPA was entered on December 18, 1995. Ohio EPA was not a party to this decree. The remedial design was approved April 15, 1997, following the issuance of the Explanation of Significant Differences on April 1, 1997. The remedial action is listed as beginning April 14, 1997.

The construction activities were separated into two discrete phases. The activities in the first phase were performed in March through April, 1997. In summary, these pre-construction activities consisted of :

- Preparation of the Health and Safety/Contingency Plan;
- Preparation of the Backwater Area Isolation Structure submittal; and
- Finalization of the Construction Quality Assurance Project Plan.

The second phase was carried out from May 1997 to June 1998. In summary, these construction activities consisted of:

- Site preparation;
- Removal of contaminated material from portions of the CRDA;
- Recontouring the CMSD;
- Installation of the CMSD seep collection and treatment system;
- Construction of the TSCA cell;
- Relocation of the outfall 004 discharge;
- Removal of contaminated sediment from the backwater area;
- Installation of the FSPSA soil flushing system and placement of a vegetative soil cover in the area;
- Construction of the Site fencing; and
- Site restoration.

The Ranney well has been operating for many years to furnish water for plant operations. About 1972, operation of the interceptor wells began to extract contaminated groundwater that was contributing to a problem with scaling on surfaces in the process water system before it could enter the Ranney well; only one of the interceptor wells is operated at a time. In about June 1994 a groundwater treatment system was added to treat water from the interceptor wells to reduce the cyanide concentrations. This pumping system was incorporated into the remedy to contain the plume and remove contaminants from the groundwater. The groundwater elevation contours in Figure 3 show that the groundwater in the area of the plume is flowing toward the pumping center.

The activities of both phases were performed in substantial accordance with the approved Final Design. There were some changes necessitated by field conditions; these changes were requested by Ormet and approved by U. S. EPA. Construction completion for the Site was reached on August 4, 1998, with the issuance of the Preliminary Close Out Report. Activities at the Site were consistent with the ROD and the ESD.

Institutional Controls

Institutional controls (ICs) are non-engineered controls, such as administrative and legal requirements, that help to minimize the potential for exposure to contamination and protect the integrity of the remedy. ICs are used to prevent exposure to contaminants remaining in soils or groundwater during and following implementation of the remedy at a Site if such residual contamination is at levels that are not protective for unrestricted use. Pursuant to the ROD and the 1995 Consent Decree, on January 10, 1996, Ormet Primary Aluminum Corporation recorded a Notice of Obligation to Provide Access and Related Covenants with the Monroe County Auditor in the chain of title for the Site. The restrictions covered the approximately 47 acres of property that had been identified and described (by legal description) in the Consent Decree as the Ormet Superfund Site. The recorded document stated that the deed restrictions were intended to run with the land. The restrictions applied to the Site property only and consisted of: 1) prohibition on use of groundwater that would entail ingestion or dermal contact until groundwater cleanup standards are achieved, but specifically permitted pumping and use of groundwater for industrial purposes; 2) no use or activities on the property that might interfere with the response activities being performed pursuant to the Consent Decree unless prior written approval from EPA is obtained; 3) no residential use of the property; and (4) no excavation, installation, construction, removal or use of any buildings, wells, pipes, roads, ditches or other structures at the Site except with the express prior written approval by U. S. EPA.

The third issue presented in the 2007 *Second Five-year Review Repor*t said, "The existing deed restriction covers only the Site property. It does not limit exposure to the contaminated groundwater located under the manufacturing portion of the facility or protect remedy components located on that portion of the facility."

Ormet Primary Aluminum Corporation and the United States of America reached an agreement on an Amendment to the Consent Decree, entered March 11, 2009, that included some additional requirements regarding the deed restrictions. As a result of this, Owner Ormet Primary Aluminum Corporation, Holders Ormet Corporation and Ormet Primary Aluminum Corporation, and the U. S. Environmental Protection Agency entered into an Environmental Covenant, under

the Ohio Uniform Environmental Covenants Act, that was recorded with the Monroe County Recorder's Office on April 16, 2010.

The Environmental Covenant concerns the Reduction Plant Property, an approximately 317-acre tract of real property owned by Ormet Primary Aluminum Corporation, located on the west bank of the Ohio River at 43840 State Route 7, Hannibal, Monroe County, Ohio, and the Ormet Corp. Superfund site (Site), a portion of the Reduction Plant Property consisting of approximately 45 acres. These are shown on Figure 2. The owner imposed and agrees to comply with the activities and use limitations with respect to the Reduction Plant Property that are in the Environmental Covenant, including, but not limited to, the following:

a) There shall be no use of or activity at the Reduction Plant Property that would interfere with or adversely affect the integrity or protectiveness of the remedial action constructed pursuant to the Consent Decree, or the operation and maintenance of any remedial action component, including but not limited to the interceptor wells, the Ranney well, groundwater treatment/seep treatment plant, CMSD multilayer cover and FSPSA soil cover, FSPSA soil flushing system, TSCA cell leachate collection system and leak detection system, and monitoring wells; or otherwise impair the effectiveness of any work to be performed pursuant to the ROD, Consent Decree, or SOW unless prior written approval is obtained from U. S. EPA.

b) There shall be no use of the groundwater underlying the Reduction Plant Property except for industrial purposes.

c) There shall be no excavation, installation, construction, or use of any buildings, pipes, roads, ditches, or any other structures on the Site except as approved in writing by U. S. EPA.

d) There shall be no construction of any well on the Reduction Plant Property, except as approved in writing by U. S. EPA.

e) There shall be no residential use on the Reduction Plant Property. The term "residential use" is defined in the Covenant.

f) If any event or action by or on behalf of a person who owns an interest in or holds an encumbrance on the Reduction Plant Property constitutes a breach of the activity and use limitations herein, owner or transferee shall notify U. S. EPA within thirty (30) days of becoming aware of the event or action, and shall remedy the breach of the activity and use limitations within sixty (60) days of becoming aware of the event or action, or such other time frame as may be agreed to by the Owner or Transferee and U. S. EPA.

The Environmental Covenant is binding upon the owner and all assigns and successors in interest, including any transferee, and is to run with the land, subject to amendment or termination as set forth in the Covenant. Compliance with the Covenant may be enforced by U. S. EPA and its representatives and the Holders (grantees of the Covenant). The Operation and Maintenance Plan was amended April 7, 2010 to include a section on institutional control monitoring.

With this Environmental Covenant, the institutional controls for the Site that are in place are effective in the short term. Long-term effectiveness requires compliance with the ICs. U. S. EPA will take steps in the future through performing a title commitment to verify that the Environmental Covenant will be identified by any title search activities and to identify any new or existing property interests that might adversely impact the effectiveness of the Covenant, and will follow up as necessary. A summary of the institutional controls at this site are shown in

Table 3 below.

Table 3: Institutional Controls Summary Table

Media, Engineered Controls & Areas that Do Not Support UU/UE Based on Current Conditions	Institutional Control Objectives	Title of IC Instrument Implemented, Planned or Recommended
Site property, groundwater and soils	• prohibition on use of groundwater that would entail ingestion or dermal contact until groundwater cleanup standards are achieved, but specifically permitted pumping and use of groundwater for industrial purposes; • no use or activities on the property that might interfere with the response activities being performed pursuant to the Consent Decree unless prior written approval from EPA is obtained; • no residential use of the property; and • no excavation, installation, construction, removal or use of any buildings, wells, pipes, roads, ditches or other structures at the Site except with the express prior written approval by U. S. EPA.	Environmental Covenant recorded with the Monroe County, Ohio, Register of Deeds, on April 16, 2010
Reduction Plant Property, soils and groundwater	Prohibit interference except maintenance and protect integrity of the remedy	Environmental Covenant, recorded with the Monroe County, Ohio, Register of Deeds on April 16, 2010

System Operations and Operation and Maintenance

There was a round of sampling of monitoring wells performed in May 1997 to provide a baseline characterization of groundwater conditions prior to the beginning of remedial activities. Routine sampling of the wells began in May 1998. Sampling is done three times a year (generally in January, May, and September). Some wells are sampled at each event, some wells are only sampled annually (in May), and a few wells are not sampled. Water levels are measured in almost all of the wells at each event. Prior to the first five-year review, the wells that were sampled at each event were 10 wells that are within and downgradient or approximately downgradient of the FSPSA and one well that is immediately downgradient of the CMSD; these wells had been identified as the points of compliance (MW-32, MW-35, MW-36, and MW-37 within the FSPSA; MW-16, MW-18, MW-28, and MW-31 at the downgradient edge of the FSPSA; MW-2 in the near plant area approximately downgradient of the FSPSA; MW-5 in the mid-plant area near the center of the plume from the FSPSA; and MW-12, downgradient of the CMSD). Figure 1 shows the monitoring well locations. These continue to be points of compliance.

Samples from the wells are analyzed for the substances for which clean-up standards were set

(see Table 1), except that samples from only five wells are analyzed for tetrachloroethene (one of these wells is one that is sampled only once a year), and for pH, specific conductance, and sodium, which are indicators of the plume. Beginning in May 2002, wells MW-44S and MW-44D, located immediately downgradient of the CMSD, were added to the wells being sampled at each event and are considered to be points of compliance. These wells are only sampled for PCBs; well MW-12 is also sampled for PCBs, beginning in May 2002. There are 21 other wells that are sampled only once each year; three of these wells (wells MW-7, MW-19, and MW-41) are considered background wells.

The interceptor wells have been operating since about 1972; in about June 1994 a groundwater treatment system was added. These wells, along with the reduction plant's Ranney well, control the direction of the groundwater flow at the Site. A pre-treatment system to pre-treat any leachate collected from the seeps at the CMSD landfill and any leachate collected from the TSCA cell within it was installed during the remedial construction. The water discharge from this pre-treatment system goes to the groundwater treatment system.

A soil flushing system was installed in the FSPSA as part of the remedy. Its purpose is to remove the contaminants, mostly fluoride and cyanide, still within the soil and transfer them to the groundwater. These contaminants are then picked up by the interceptor wells. The flushing system is turned off during the coldest months of the year (typically from November through March). Two supplementary components were added to the original flushing system after the initial construction to enhance its performance. After heavy rains, surface water was observed to frequently pond in the southern portion of the FSPSA. In order to minimize this ponding and thereby deliver additional water to the subsurface, a series of shallow infiltration trenches were installed in the regraded FSPSA material. The infiltration trenches were installed to an approximate depth of 1.5 feet. The second improvement involved adding a shallow sump equipped with a small pump to the southern part of the FSPSA that was susceptible to ponding. The pump sends the water from the sump to the northernmost portion of the FSPSA where the water is discharged to the surface via a spray-hose. The flushing system was operated on a trial basis from August 1998 through October 1998, with flushing being done for about three hours per day. Beginning in April 1999, full operation began, flushing for eight hours per day. In 2001, to reduce ponding that had been occurring, the operation was modified; the system continuously cycles, on for about 1.5 hours and off for 0.75 hours, for a total of about 14 hours per day

Maintenance also includes periodic inspections of the various components of the remedy and repairs when needed. The results of these inspections are reported to U. S. EPA annually.

V. Progress Since the Last Five-Year Review

The issues that were noted in the 2007 five-year review along with the recommendations and follow-up actions that were presented are shown in Table 4 below.

Table 4: Recommendations and Follow-Up Actions from 2007 Five-Year Review

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Mile-stone Date	Action Taken	Date of Action
CMSD cover needs to be repaired and its maintenance needs to be improved.	Repair has been proposed. It is expected to be implemented by early summer. Maintenance procedures have been proposed.	PRP	U. S. EPA	Sept. 2007 for repair; maintenance is on-going	Repaired	Sept. 2007
Fluoride downgradient of FDP-5 increased	The concentrations need to be tracked	PRP	U. S. EPA	On-going	Tracking	
ICs--effectiveness and completeness	Change the form of the ICs and place some restrictions on the rest of the reduction plant	PRP/U. S. EPA	U. S. EPA	October 2007	Environmental Covenant	April 2010

In the "Institutional Controls" subsection above the third issue is discussed. The subsection goes on to describe how the institutional controls have been improved through the recording of an Environmental Covenant with the county. The other two issues raised are discussed here.

CMSD Cover Repair

In June 2006, field maintenance personnel at Ormet detected a partial failure of the CMSD landfill multilayer cap on the river (southern) side of the landfill. Ormet's contractor inspected the failed areas of the cap and submitted specifications for temporary repairs by the end of June. The temporary repairs were completed in August 2006. Permanent repairs were performed from June 2007 through September 2007. An analysis of the failure and plans for the temporary and permanent repairs were the subjects of separate reports. The permanent repairs are covered in the report, *Construction Assessment of the CMSD Landfill Cap Repair*, March 31, 2008.

Groundwater Monitoring

The water levels in the wells show that the water table under much of the Site is below the water level in the Ohio River. (On July 11, 2011, the water elevations at the two measuring points in the river pool, RP-1 and RP-2, were 623.97 and 624.02 ft above msl. See Figure 3 for the groundwater elevations on this date.) Thus, water is flowing from the river into the aquifer, which prevents the contamination in the aquifer from passing into the river. This direction of flow is caused by the pumping influence of the interceptor wells and the reduction plant's Ranney well. Water level plots also indicate that the operation of the soil flushing system at the FSPSA has no discernible effect on the groundwater flow patterns in that area. Plots of the concentrations of fluoride, total cyanide, and amenable cyanide show the contaminated plume extending from the FSPSA area down to the interceptor wells. Well MW-5 is near the center of the plume and about 1000 ft upstream of the interceptor wells. The concentrations of fluoride and amenable cyanide continue to be above the clean-up levels in the vicinity of well MW-5.

Groundwater monitoring has been carried out in accordance with the *Remedial Action Groundwater Monitoring Plan*, Revision 1, April 28, 1997. The two substances in the groundwater that are of most interest are cyanide and fluoride.

The cleanup goal for cyanide established in the ROD (0.2 mg/L) is the MCL for free cyanide. Cyanide amenable to chlorination, which has been used as a surrogate for free cyanide, is that portion of total cyanide existing as free cyanide, cyanide salts, and weakly bound cyanide complexes apt to contribute to free cyanide. Beginning in November 2010 Ormet initiated routine analyses for weak-acid dissociable cyanide (WAD cyanide), as it also quantifies concentrations of free cyanide, cyanide salts and weak cyanide complexes apt to contribute to free cyanide, and is regarded to be a more reliable and consistent surrogate for free cyanide. Table 5 in the *2011 Annual Remedial Action Groundwater Monitoring Report Ormet Corporation Superfund Site*, March 22, 2012, contains the 2011 results for total cyanide, amenable cyanide, and WAD cyanide. In nearly all cases the WAD cyanide concentration is less than the amenable cyanide concentration; in many cases it is one to two orders of magnitude less. Based on the historical data, dating back to 1983, as well as the data in Table 5 of the monitoring report, the predominant form of cyanide occurring in the groundwater beneath the Reduction Plant property are the more stable cyanide complexes. The concentrations of amenable or free cyanide historically reported and the concentrations of WAD cyanide more recently reported are typically much lower than the total cyanide concentration.

It is to be noted that analysis for amenable cyanide tends to be subject to a greater degree of variability than analyses for other plume indicators, such as total cyanide and fluoride; the WAD cyanide results have shown much less variability. At two of the compliance wells, the most recent total or amenable cyanide concentrations have generally been below the clean-up goal; at MW-12 the total cyanide has frequently been below the detection limit while amenable cyanide at MW-28 has generally been below the MCL since May 2002. A trend of decreasing concentrations of total cyanide is apparent at compliance wells MW-2, MW-16, MW-18, MW-28, MW-31 and MW-37. At wells MW-5, and to a lesser extent MW-32, a trend of increasing total cyanide concentrations had been observed but, at both wells, concentrations appear to have stabilized and begun a decreasing trend. At MW-35 and MW-36 concentrations show a decreasing trend in recent years. In about 2005, in five wells downgradient of FDP-5 (wells MW-15, MW-17, MW-34S and MW-34D, which are just inside the FSPSA, and well MW-39D, which is between FDP-5 and FDP-4) there were increases in the concentrations of total cyanide. Most of these wells still have concentrations greater than those before 2005, but the concentrations are decreasing or holding steady.

The fact that some concentrations of the contaminants that are being flushed from the FSPSA are holding steady or even increasing slightly in the groundwater does not mean that the remedy is not working. It just means that the contaminants are still being flushed out of the soils in the FSPSA faster that the groundwater can remove them from the area.

Fluoride concentrations have consistently been below the cleanup goal of 4 mg/L at compliance wells MW-12 and MW-28. Recently, fluoride concentrations have also typically been below the cleanup goal at MW-35 and MW-37. Following increases in fluoride concentrations attributed to the beginning of soil flushing, a general decreasing concentration trend is observed at compliance wells MW-2, MW-16, MW-18, MW-31, MW-35, MW-36 and MW-37. At MW-5 and MW-32

increased concentrations of fluoride following the beginning of soil flushing persisted longer than at other wells, and in recent years the concentrations have stabilized. Around 2005 there were also increases in the fluoride concentrations in several wells downgradient of FDP-5. These concentrations are now decreasing or holding steady. Figure 3 shows the fluoride isopleth map for the data from July 2011. This shows the plume that extends from the area of the FSPSA toward the interceptor wells. The isopleth map for total cyanide is similar.

Arsenic concentrations in wells MW-5, MW-12 and MW-28 reported since 1997 have consistently been below the clean-up goal of 0.01 mg/L listed in the ROD, and at MW-36 and MW-37 concentrations reported since mid 2006 have typically been below the 0.01 mg/L clean-up goal. In wells MW-2, MW-18, MW-31 and MW-35, the concentrations have been decreasing. In wells MW-16 and MW-32, the concentrations increased in the period from about 2000 to 2006 but have been fairly steady since. Ormet has proposed that the background level for arsenic, and hence the clean-up goal, should be 40 µg/l, the highest concentration found in the wells that were proposed as being background wells. The Agency has not accepted this level. Some wells are currently above this value.

Beryllium concentrations have generally been below the clean-up level, as have vanadium concentrations. Tetrachloroethene (tetrachlorethylene) (PCE) is analyzed for in the five wells where it was detected during the RI. Recently, it is above the clean-up level in three of the five wells being sampled.

Manganese results for MW-28 have consistently been below the ROD-specified cleanup goal of 0.23 mg/L and, in recent samples, also typically below the cleanup goal at MW-36 and MW-37. At MW-2, MW-S, MW-16, MW-18, MW-31, MW-32, MW-3S, MW-36, and MW-37, increased manganese concentrations that roughly coincided with soil flushing activities appear to have peaked and have since shown a general decreasing trend. Ormet has proposed that the background level for manganese, and hence the clean-up goal, should be 9780 µg/l, the highest concentration found in the wells that were proposed as being background wells. The Agency has not accepted this level. It is to be noted that the secondary maximum contaminant level (SMCL) for manganese is 50 µg/l and the tentative clean-up level set in the ROD is 230 µg/l, which was identified as a background value during the RI. The manganese concentrations will be evaluated in the future. More data over time for the manganese concentrations will lead to a better understanding of the trends and what might be a reasonable clean-up level. In the meantime the clean-up level identified in the ROD will be used.

There continue to be no detections for PCBs in the wells where the analysis is done.

The flow patterns determined from the water level measurements in the wells show that the water removed by the interceptor wells and the reduction plant's Ranney well continue to contain the plume. These wells continue to remove contaminants from the aquifer. The soil flushing system appears to be accomplishing its intended purpose, transferring contaminants from the soil in the soil flushing area to the groundwater.

The calculations of mass-in-place and the calculated amounts of mass removed from the aquifer for fluoride and total cyanide continue to show that these two substances are still being added to the aquifer.

The operation and maintenance reports indicate that there have been few problems with the Site.

Trees for Removing Contaminated Water

In May 2011, Ormet requested approval to install trees in the French drain at the downgradient boundary of the CMSD. This French drain captures groundwater and leachate from the CMSD which empties into four large sumps. The volume of water collected in the sumps had declined in recent years. Approval was granted. The trees (weeping willows) were installed (planted) in the sumps in July 2011. The purpose of the trees is to draw up water from the sumps and allow it to evaporate so that it will be unnecessary to pump the water from the sumps to the small treatment plant used for this water, or at least greatly reduce the amount that must be pumped to the treatment plant. The trees were checked in August and appeared to be growing. As of the time of the five-year review Site visit, the trees had been performing very well and appeared to be healthy and growing. It had not been necessary since their installation to pump any water from the sumps. If necessary, the trees will be watered so that they can continue to survive.

Second Explanation of Significant Differences for Remedy Change

In July 2009, Ormet requested approval from U. S. EPA to discontinue the operation of the interceptor wells and the accompanying water treatment system. Ormet maintained that the interceptor wells were no longer needed to protect the process water being withdrawn by the Ranney well. Ormet had evaluated their operation and demonstrated that the Ranney well, operating alone, would be capable of hydraulically containing the plume of contaminated water within the Ormet reduction plant facility property to prevent the contaminants from migrating in the subsurface to the Ohio River or to the adjacent rolling mill property. They also calculated that the discharge of the Ranney well water to the river, in the absence of the interceptor wells and associated water treatment, would still meet the requirements of the NPDES permit. U. S. EPA evaluated Ormet's proposal and determined that the approval of the proposal would require the issuance of an Explanation of Significant Differences.

Ohio EPA did not agree that the interceptor well operation should be discontinued. Ohio EPA proposed that the present interceptor wells be shut down and replaced by an interceptor well in the vicinity of monitoring well MW-2, which is about 800 feet downgradient from the FSPSA area and about 1900 feet closer to the FSPSA area than the present location of the interceptor wells. The water from this well would be sent to the existing treatment plant. They modeled the groundwater flow to demonstrate that the aquifer would be cleaned up sooner with the new location. Their modeling showed that the aquifer could be cleaned up in about 21 years with the present operation, in about 14 years with the proposed new interceptor well location, and in about 25 years with no interceptor well. However the modeling was not able to include the addition to the aquifer of additional contaminants from spraying the FSPSA area. Ormet's contractor took the time versus concentration data that has been collected for two wells at the downgradient edge of the FSPSA area and extrapolated this into the future. This showed that the aquifer would be cleaned up at these two wells in about 25 to 30 years with the present interceptor wells and the spray field being operated. U. S. EPA decided to proceed with eliminating the requirement for an interceptor well at the Ranney well. It appeared that the operation of an interceptor well with a treatment system was no longer cost effective and no longer needed to maintain the

effectiveness of this part of the remedy. An ESD for approving this change was signed March 26, 2012.

VI. Five-Year Review Process

Administrative Components

The Ormet Corp. Superfund Site five-year review report was prepared by Bernard Schorle, EPA RPM. Ohio EPA's site coordinator, Michael Sherron, and the PRP's representative, John Reggi, were informed that the review was being prepared. The five-year review consisted of a Site inspection and review of relevant documents.

Community Notification and Involvement

The U. S. EPA's community involvement coordinator, Virginia Narsete, talked with some of the residents of the area about the Site. Overall, these residents had no concerns about the Site or a possible human health threat due to the Site. Local businesses that were interviewed did not believe the cleanup had affected local jobs or businesses. They were not concerned about the human health threat. There were concerns about the future of the company because of the bankruptcy the company went through a few years ago. There are very few jobs available in the area and Ormet is a major employer. The type of information the people want to see is in the newspaper. Many do not have a computer for obtaining material about the Site from the Internet. The Library staff said that no one had asked for material in years .

An advertisement announcing the completion of the five-year review and the availability of the report once the report is signed will be placed.

Document Review

In preparation for this five-year review report, Site documents were reviewed including the following:

- The annual remedial action groundwater monitoring reports that are submitted each spring for the previous year. The most recent of the groundwater monitoring reports was received in March 2012. This groundwater monitoring report covered the results of the monitoring for 2011. It included a table presenting the results for the groundwater monitoring for the wells being monitored that includes data from as far back as late 1983.
- The annual O&M reports that are submitted each year, usually in January.
- The request by Ormet for the remedy change and the back-up material that Ormet furnished. The back-up material included data on the operation of the Ranney well and the interceptor wells that they do not have to include in the annual reports. These documents are listed in the administrative record list update developed for the ESD.
- Extra reports from Ormet dealing with the repair of the CMSD cover and the tree remediation.

Data Review

The review consisted primarily of reviewing the reports that Ormet submits that are listed above. Ohio EPA conducts periodic inspections of the facility and reports its observations to U. S. EPA. These are all reviewed by U. S. EPA. The results of this data review are discussed in the "Progress Since the Last Five-Year Review" section of this report.

Site Inspection

The five-year review Site inspection was conducted on April 12, 2012, by Michael Sherron of Ohio EPA and Bernard Schorle of U. S. EPA in the company of two representatives from Ormet. The purpose of the inspection was to observe the Site, especially the CMSD, and check on those things that are not generally reported on. The Site appeared to be in very good condition. The CMSD cover appears to be performing very well, and the vegetative cover is in much better condition than it has been in the past. The willow trees in the French drain look very healthy. FDP-5 continues to have vegetative growth spreading out, but water is still visible in part of it. The spray field was not being operated because the temperature had dropped below freezing the previous night. The interceptor wells and the treatment plant for their discharge was no longer running. The system had been shut down a few days before the ESD had been signed because of a operational problem and it had not been restarted. There were no observations of any violations of the institutional controls. The Site and its operation were discussed with the Ormet representatives.

VII. Technical Assessment

Question A. Is the remedy functioning as intended by the decision documents?

Yes, the remedy is functioning as intended by the decision documents. The review of documents, ARARs, risk assumptions, and the results of the Site inspection indicate that the remedy is functioning as intended by the ROD, as modified by the two ESDs.

Question B. Are the exposure assumptions, toxicity data, clean-up levels, and remedial action objectives used at the time of the remedy selection still valid?

Yes, the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection are still valid. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy.

As the remedial work has been completed, most ARARs for remedy construction cited in the ROD and/or amended by first ESD have been met. The ARARs that remain to be satisfied include:

1) The Safe Drinking Water Act (SDWA) (40 CFR 141)--the SDWA maximum contaminant levels are relevant and appropriate to groundwater remedial actions where the groundwater is a current and/or potential sources of drinking water.
2) For the Clean Water Act, OAC 3745-33, Ohio NPDES Individual Permits--NPDES requirements are applicable to direct discharges of pollutants to surface waters.

Changes in standards: There has been one change in the standards. The MCL for arsenic has changed from 50 µg/l to 10 µg/l. However, the ROD had set the clean-up level for arsenic at 10 µg/l.

Question C. Has any other information come to light that could call into question the protectiveness of the remedy?

There has been no other known information that could call into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed, the Site inspection, and discussions with the state's Site Coordinator and Ormet's representative, the remedy is functioning as intended by the ROD as amended by the first ESD. There have been no changes in the physical conditions at the Site that would affect the protectiveness of the remedy. The only change in ARARs that was found that might affect the clean-up standards in the groundwater is the change in the MCL for arsenic from 50 µg/l to 10 µg/l, but the clean-up standard for arsenic had already been set at 10 µg/l. The other clean-up standards, except that for manganese, are set at the MCLs or proposed MCLs. The clean-up standard for manganese is to be revisited; the background level must be determined, and it is likely that the background level will be the clean-up standard.

VIII. Issues

No issues were identified during the five-year review that affect the protectiveness of the remedy.

IX. Recommendations and Follow-Up Actions

No recommendations or follow-up actions were identified during the five-year review, other than to verify the institutional controls as discussed in Section IV before the next five year review.

X. Protectiveness Statement

The remedy at the Ormet Corp. Superfund Site is protective of human health and the environment in both the short- and long-term. Exposure pathways that could result in unacceptable risks are being controlled and an Environmental Covenant is preventing exposure to contaminated groundwater and land. Threats at the Site have been addressed through capping, excavation, soil flushing, plume containment, installation of fencing, and implementation of institutional controls.

XI. Next Review

The next five-year review for the Ormet Corp. Superfund Site is required in May 2017, five years from the date of this review.

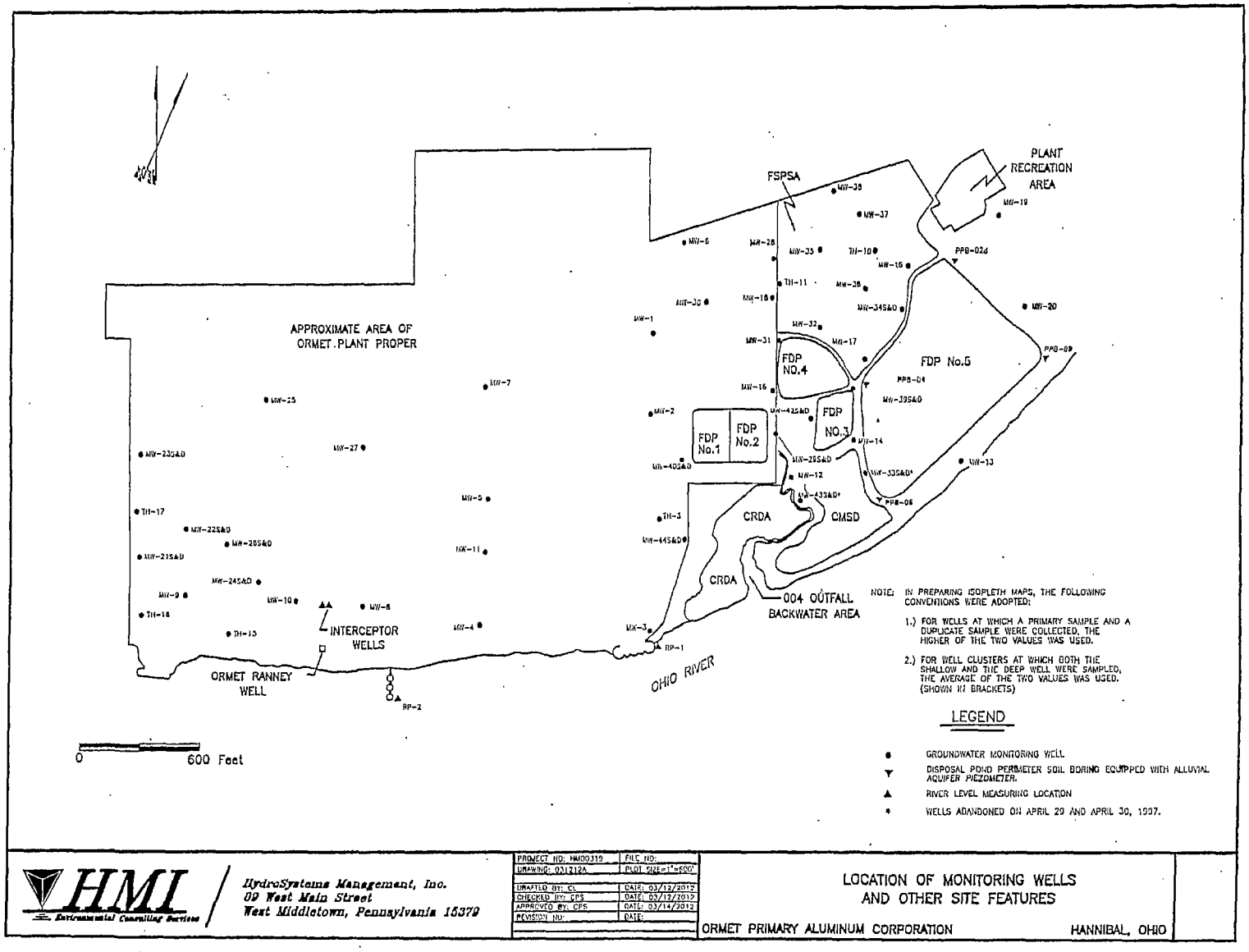

Figure 1. Base Map

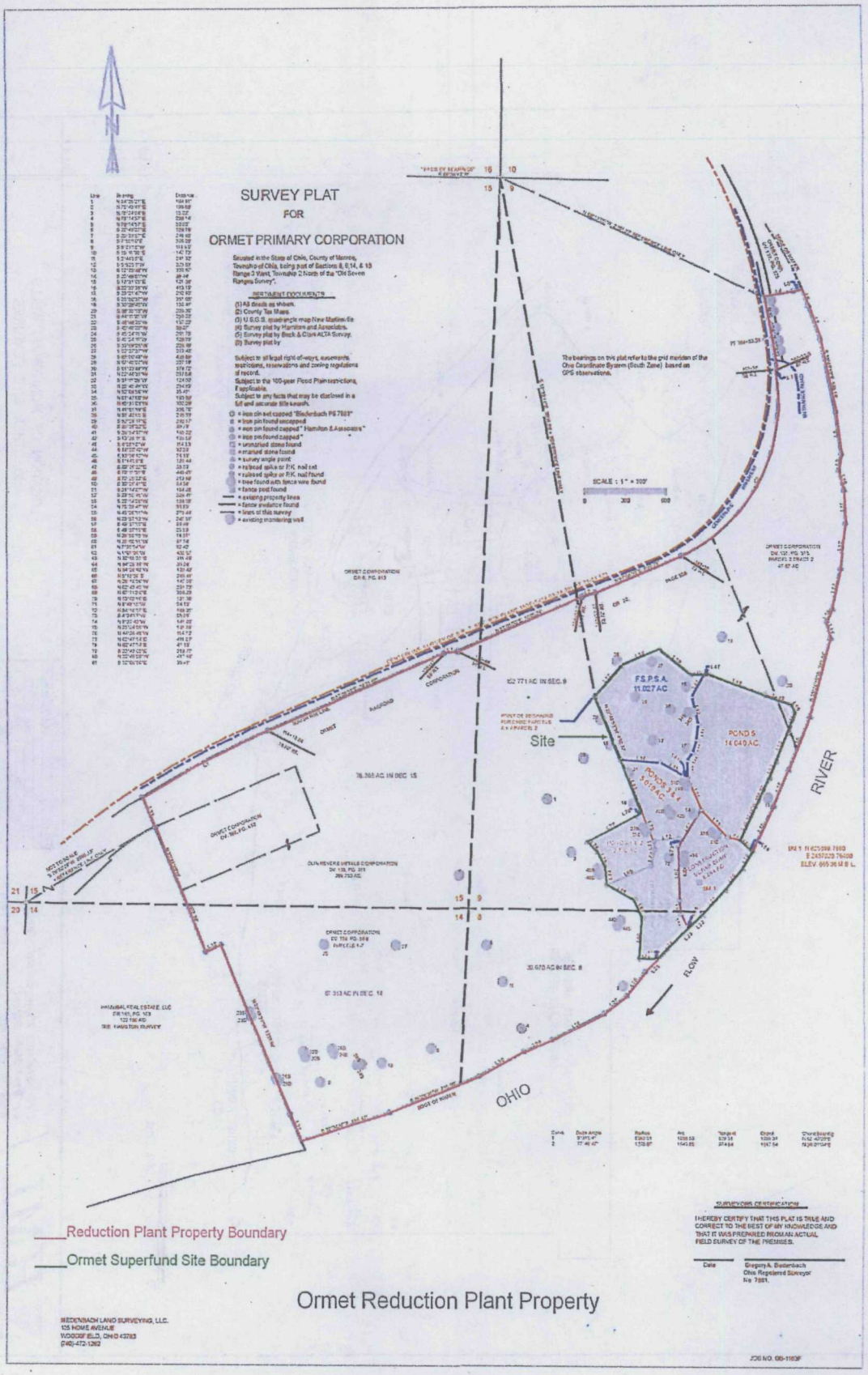

Figure 2. Property Map

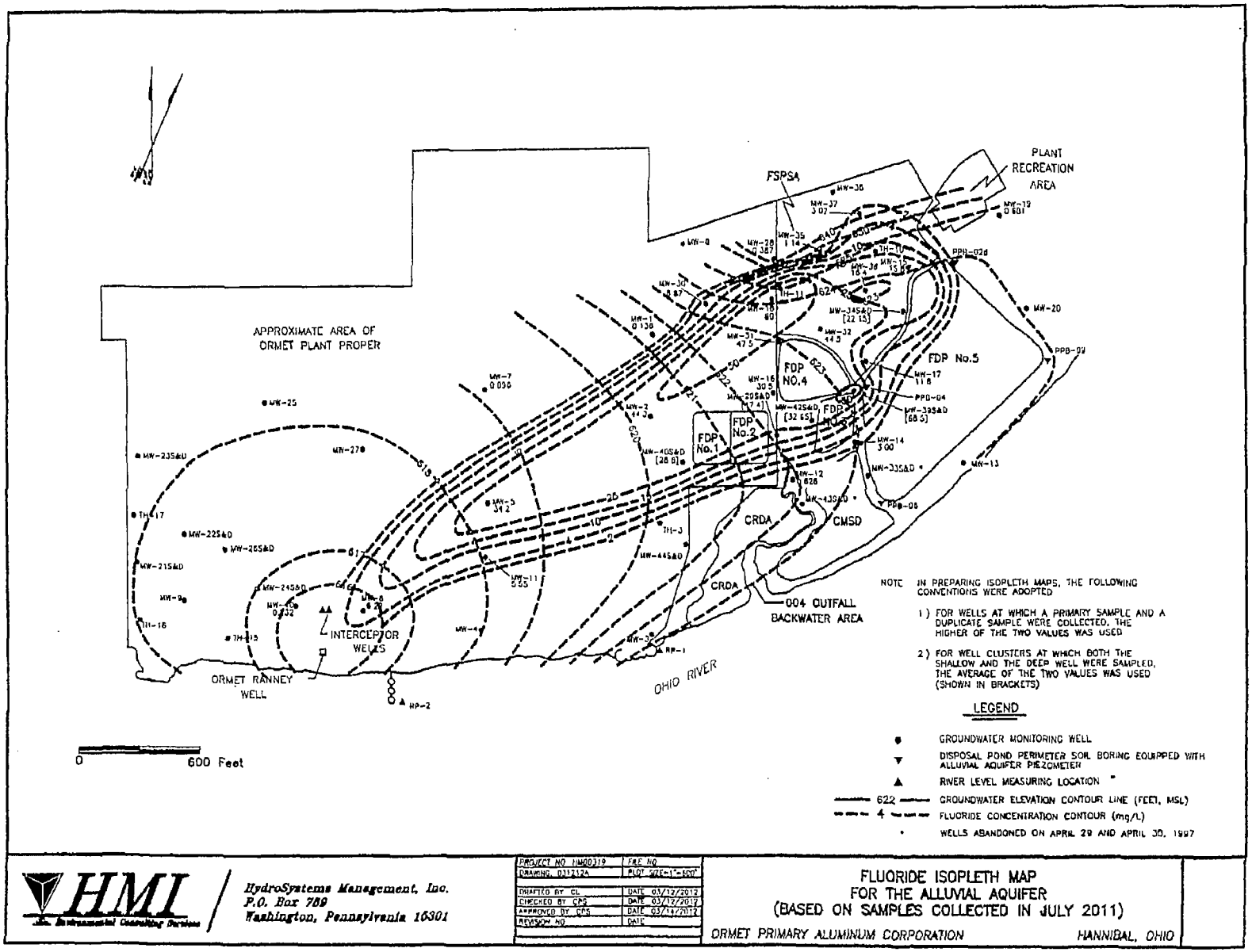

Figure 3. Groundwater Elevations and Fluoride Isopleth Map